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FISHERIES BULLETIN

Volume III Number 4
July-August 1950

D AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
hington, D.C., U.S.A.

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FOOD AND AGRICULTURE ORGANIZATION
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Economic Notes

THE PORTUGUESE FISHERIES INDUSTRY

The Portuguese fisheries industry normally employs more than 35,000 fishermen in the several branches of activity. These fishermen, including labor in related occupations, make up the largest part of the coastal population, which was computed in 1938 at about 500,000 people.

Craft. Portuguese fishing craft in operation in 1944 and 1947, with their tonnage, are listed below. There were in 1947, in addition to the craft listed, 108 motor vessels of over 100 gross tons each.

Craft	Number	Tonnage
1944: Total	7,274	61,791
Sailing craft	6,596 (90%)	14,464
Powered craft	678 (10%)	47,327
1947: Total	9,107	74,443
Sailing craft	8,160 (89%)	15,984
Powered craft	947 (11%)	58,459

The cod-fishing fleet also has considerably increased in number and tonnage during recent years, with a definite trend towards mechanization. Its rapid expansion is shown by the following index numbers for tonnage.

Tonnage of Cod-fishing Fleet: Base 1938-39 = 100 (18,000 tons)

1940	1941	1942	1943	1944	1945	1948
106	114	118	129	140	173	260

Landings. The average annual landings in continental Portugal in 1938 and 1939 amounted to 203,000 metric tons with a value of 208,000 contos. In 1948, 204,000 metric tons, having a value of 859,000 contos, were landed. The breakdown of landings figures for the most important species is as follows:

Species	1938-39 Average				1948				1949 a/	
	Q. 1000 tons	Percent b/	V. 1000 contos	Percent b/	Q. 1000 tons	Percent b/	V. 1000 contos	Percent b/	Q. 1000 tons	Percent b/
Sardines ..	100	50	60	32	78	39	253	33	63c/	45
Horse mackerel	22	11	16	8	32	16	74	1	29c/	10
Cod	16	8	36	18	36	16	215	29)	125c/	23
Hake	10	5	33	16	12	6	104	12)		

a/ Includes the Azores and Madeira.
b/ Percent of total landings.
c/ Includes allied species.

It is to be noted that according to the landings figures of the Corporative Sardine Organization (GAPS) 1/ for sardine landed in continental Portugal by its craft, 1948 landings, owing mainly to a sudden scarcity of sardine off the Portuguese coast, amounted to no more than 48,000 tons, as compared with 101,000 tons for 1947. As the sardine catch is the most important of all in quantity as well as in value, this decline indicates a serious crisis for the Portuguese fisheries industry. Also, this decrease is in direct contrast to the progressive increase observed in general for the fishing fleet and in particular for the sardine fleet, which has increased its number by 60 percent since the end of World War II. Causes for the scarcity of sardines during the past three years are now being studied by Portuguese scientists.

As a consequence of the scarcity, the average gross income of each craft during 1947 and 1948, according to a report published by GAPS, amounted to 747 contos and 737 contos, respectively - the lowest figures recorded during recent years. According to the same report, the fishing industry's 1947 balance sheets for sardine (excluding investments for maintenance of capital goods) showed the following:

No. of craft operating with deficits . . . . 207, or 53 percent of total
No. of craft which balanced the operating costs. . . . . 95, or 24 percent of total
No. of craft which showed net profits . . 89, or 23 percent of total

Canning Industry. In 1945, 242 fish-processing factories were in operation, 174 of which were using oil and salt preservation techniques, and 68 salt preservation alone; 126 factories (oil and salt) employed 100 or more workers each. In 1948, 240 factories were active - 180 for oil and salt preservation and 60 for salt preservation alone; 126 factories were listed as employing 100 or more workers each.

The breakdown by species and kinds of pack is given in quantities and percentage of total production for 1948 as follows:

Production of Canned Products, 1948

	Net tons	Percent
Sardines		
In oil or sauces	17,429	66
Preserved in salt	910	3
Preserved in salt (spiced)	327	2
In fillets (spiced)	113	ó
Allied species of sardines		
In oil or sauces	770	3
Preserved in salt	2,182	8
Preserved in salt (spiced)	994	4
In fillets (spiced)	1,780	7
Tuna		
In oil or sauces	1,211	5
Preserved in salt	85	ó
Allied species of tuna		
In oil or sauces	316	2
Preserved in salt	13	ó
Mollusks and Crustaceans		
In oil or sauces	186	ó
Total	26,316	100

1/ Gremio dos Armadores da Pesca da Sardinha.

The fact that Portugal has to import the tin plate needed for the manufacture of cans explains the decline in production of canned sardines during World War II, as compared with the prewar output, and also explains the decrease recorded in the same period for the output of canned sardines,as compared with the salted product.

In 1948 the canning industry as a whole used 50 percent electric and 50 percent steam power, aggregating some 10,000 horsepower altogether. It employed 24,783 workers in 1948 during the period of maximum output, 15,372 of whom were on a part-time basis. At full strength, about 82 percent of the industry's employees are female workers, and when the industry is operating full time, average daily wages range between 10 and 20 escudos.

Canning Industry Index Numbers: Base 1938 = 100 (monthly average)

	1947	1948	1949
Sardine landings in continental Portugal (quantity)	83	68	46
Output of canned or salted sardines (quantity) a/	84	52	32
Exports of canned fish (quantity)	98	112	62

a/ Monthly average for 1941 = 100.

In view of these index numbers for the landing and production of sardine in the sardine-preserving industry and for exports of canned fish, it may be seen, as might be expected, that the consequences of the poor catch are reflected in the extreme decline in production of sardine and export of canned fisheries products for 1947, 1948, and 1949. As already pointed out, the most important problem for the sardine-canning industry at present arises from the progressive decline in the sardine catch.

In 1948 the sardine catch amounted to half the quantity caught in 1947. Considering that the catching and processing of sardines represent a gross income of over one million contos per year, one can hardly underestimate the present crisis and its effects on the Portuguese economy.

The sardine-canning industry, being heavily taxed and under the compulsion of providing for a more or less constant labor force to process the much diminished quantity of raw material, is faced with a rising cost per unit of product. It is therefore at a disadvantage in meeting keen competition from new centers of production in other countries.

This situation is further complicated by the fact that World War II brought about the loss of most of the German market for Portuguese sardines, and that the disturbed postwar economic conditions affecting international trade have greatly reduced sardine exports to the rest of Europe.

Certain handicaps are also seen in the technical backwardness of some of the small and medium-sized canneries, but it may be pointed out that this is to be expected since, for the reasons set forth above, the industry is working at only one-third of its production capacity, which is computed at six million boxes annually.

CRAFT AND FISHERMEN IN SEVERAL PORTUGUESE TERRITORIES

Recent available information on craft and fishermen in several Portuguese territories is presented below. In the case of the Cape Verde Islands, São Tomé and Principe, and Timor, where figures are given for only one postwar year, the number of craft and fishermen has remained fairly constant since 1938. As no prewar figures were available for Angola, a war year and a postwar year are given. For Mozambique, however, there are data for both a prewar and a postwar year.

	Year	Number
Angola		
Craft, propelled	1944	26
	1948	57
Rowing and sailing boats	1944	1,567
	1948	1,767
Fishermen	1944	8,495
	1948	10,495
Cape Verde Islands		
Crafy, motored	1945	5
Rowing and sailing boats	1945	510
Fishermen	1945	1,679
Mozambique		
Craft, motored	1938	7
	1948	6-7
Rowing and sailing boats	1938	460
	1948	1,230
Fishermen	1938	1,359
	1948	5,349
São Tomé and Principe		
Rowing and sailing boats	1948	1,748
Fishermen	1948	1,405
Timor		
Rowing and sailing boats	1948	150
Fishermen	1948	300

PROMOTION OF NORTHERN NORWAY'S FISHERIES INDUSTRY 2/

The Norwegian Ministry of Fisheries is proposing the formation of a large company for the utilization of fish products in northern Norway, where there are some of the biggest fisheries in the world. The State will be the principal shareholder in the proposed company, but stock will also be held by the Norwegian Fishermen's Organization, the Norwegian Trade Union Congress, and other organizations connected with Norwegian fisheries. The company is to take over existing factories in northern Norway and further develop the industry.

One of the main activities of the company will be the development of the fish fillet industry, along with the production of fish meal and the preparation of dried fish in factories. The initial capital which will be 12 million kroner, will later be increased to 20 million kroner. The fishermen themselves, through their organizations, will have a strong influence in the company's business administration.

2/ Source: News of Norway (Norwegian Information Service, Washington, D.C.), Vol. 7, No. 25 (24 June 1950).

Developments

FISHERIES RESEARCH INSTITUTE OF THE UNIVERSITY OF WASHINGTON

The endowment of scientific research is widespread in many industries. However, the sponsorship by the fishing industry of the Fisheries Research Institute of the University of Washington (Seattle, U.S.A.) is one of the first instances where research in fishery biology on commercially important species has been entirely and liberally endowed by private sources.

The Institute was founded in 1947, growing from a research project initiated in 1945 by a group of salmon operators of the Bristol Bay region of Alaska. The original sponsors asked Dr. W.F. Thompson, then director of the School of Fisheries of the University of Washington, to undertake a preliminary biological study of the red salmon (Oncorhynchus nerka) of the Bristol Bay area. The program was continued and expanded in the following year. In 1947, the University established the Fisheries Research Institute to carry on the work with Dr. Thompson as director. In the same year, the research program was expanded to cover southeastern Alaska, and in 1948, the studies further included the Kodiak Island region and all the species of salmon found in Alaska. This expansion was made possible by additional financial grants that were made voluntarily by the salmon-canning companies operating in Alaska.

Although the present activities of the Institute are primarily those of investigating Alaska salmon, it can and will undertake any fisheries biological and technological research problem. The operating funds of the Institute amounted to approximately US$300,000 in 1949. The annual amount received from the canners is determined by the number of cases packed in the preceding year, each canner being assessed a fixed amount per case of fish canned. The Institute has an Advisory Board consisting of eight members from the fishing industry.

The present research program seeks the information necessary to provide a scientific basis for the proper management of the salmon resources in Alaska. The Institute is not designed to compete with existing research programs of government agencies but co-operates with these agencies in order to supplement their programs without duplication and overlap.

FISHERIES DEVELOPMENT CORPORATION OF SOUTH AFRICA, LIMITED

During the inter-war period, the commercial marine fisheries of the Union of South Africa were virtually undeveloped, with the exception of the offshore trawling industry, which supplied most of the country's fresh fish, and the inshore crawfish fishery, which produced canned crawfish and frozen crawfish tails for the export markets.

About 5,000 fishermen, 1,134 rowing and sailing boats, and 307 motorboats, were operating in 1931 from the various fishing centers along the coastline. The fishermen lived mostly on an impoverished level with depressed incomes, bad housing, and

generally unsatisfactory social conditions. It was virtually impossible for them to build up savings out of their meager incomes; they had no access to credit facilities and, in addition, even if capital were available, the insufficiently protected harbors would have prevented the introduction of larger-sized boats requiring greater investments of capital. Alternate periods of glut and scarcity of catch landed at isolated inshore centers with limited market outlets aggravated fluctuating price levels.

During the inter-war period, several commissions investigated the fisheries and recommended government action to improve conditions in the inshore fisheries. During the last decade preceding the outbreak of World War II, a program of fisheries harbors development was put into effect, and over a period of 17 fiscal years (1931/32-1947/48), an amount of 593,000 South African pounds allocated by the government was spent on improving these harbors; this program, which is still continuing, facilitated the expansion of the motored fishing fleet to 458 motored craft in 1940 and 721 in 1949.

Until 1940, the marine fisheries were controlled by the provincial administrations of the two maritime provinces, but by Act No. 10 of 1940, practically all these commercial fisheries were transferred to the administrative supervision of the Division of Fisheries (until then a marine biological research unit only) of the Department of Commerce and Industries. 1/

In 1944, Act No. 44 was passed by the South African Legislature. 2/ The main features of this act were the articles pertaining to the establishment and formulation of the objects and powers of a government-sponsored "Fisheries Development Corporation of South Africa, Limited."

Article 3 of this act, assented to by the Governor-General on 6 June 1944, defined the objects of the Corporation to be as follows:

"(a) to establish and manage and to facilitate or assist in the establishment or management of schemes for the promotion, regulation or better organization of the catching or sale of fish, and to finance and to facilitate or assist in the financing of such schemes: provided that any such scheme relating to the sale of fish may provide for the sale of fish by the corporation on behalf of fishermen;

"(b) to carry on the business of buying, selling, processing and marketing fish, fish products, and seaweed, of manufacturing fish products and products wholly or partly derived from seaweed, and of fish farming;

"(c) with the approval of the Governor-General to take or otherwise acquire and hold shares or stock or securities in any company engaged in catching fish or having objects wholly or in part similar to those described in paragraph (b);

1/ Union of South Africa. Act to Provide for the control of sea fisheries for the better marketing of sea fish, and for matters incidental thereto. Act No. 10. 1940

2/ Union of South Africa. Act to Promote the development within the Union of the fishing industry, to establish a corporation and an advisory council for that purpose and to provide for matters incidental thereto. Act No. 44. 1944

"(d) with the approval of the Minister to establish and carry on or to assist in the establishment and carrying on of mutual benefit and medical benefit societies, sporting and entertainment societies, social clubs, townships, housing utility companies, home ownership schemes, social and health services, pension and provident funds, stores, hospitals, hostels, restaurants and any other similar undertakings which may seem to the corporation beneficial or capable of being beneficial to fishermen registered ...."

Articles 12 and 13 determine that the share capital of the Corporation shall consist of two principal types:

1. There shall be 500,000 "A" shares of one South African pound each, to be taken up by the Governor-General and to be used for purposes (a) and (d) of Article 3 as quoted above;

2. There shall also be a number of "B" shares of one pound each which can be offered for subscription or for allotment at not less than par, and the capital derived from these "B" shares is to be used for purposes (b) and (c).

The Governor-General, by virtue of his "A" share holdings, is entitled to a number of votes exceeding by one the total number of votes held as an aggregate by the other shareholders.

Other articles of this act define in detail the registration powers, the constitution of the board of directors, the borrowing powers, accounts and auditing, appropriation of profits, and other aspects of the Corporation.

By September 1949, 500,000 £SA1 shares were paid up. Since its establishment more than five years ago, the Corporation has spent approximately £SA230,000 on housing schemes for fishermen at the various centers. Loans amounting to £SA65,000 were made to fishermen under the Corporation's boat-financing scheme, which has already provided 31 motor fishing craft to the inshore fishing fleet of the country. 3/.

The directors and the staff of the Corporation have been exploring the questions of the technical training of fishermen and the development of oyster culture in suitable lagoons. They are consulted on the improvement of the fisheries harbors through amounts allocated by governmental loan funds, conservation of fish and crawfish stocks, possibilities of restocking depleted crawfish beds, experiments in new fishing techniques, etc.

Under the fields of activities for which "B" shares can be used, the guiding influence of the Corporation, through the provision of capital and the appointment of its representatives on the directorates, has had a stimulating effect on inshore fisheries activities. In a dozen associated companies, a total of over £SA400,000 has been invested from "B" share funds and profits on earlier investments. In most cases the Corporation has no absolute control over the private enterprises through the number of shares held; its holdings entitle it merely to a reasonable amount of guidance. The crawfish-canning plants along the arid coast of the northern Cape of Good Hope were technically improved. New plants for the canning of crawfish, pilchards, snoek, maasbankers, etc., were established, together with reduction plants for the manufacture of fish meal and oil. Together with these extensions and improvements in the

3/ Fisheries Development Corporation of South Africa, Limited. Annual Reports. 1945-49 Nos. 1-5 (1 October-30 September 1945-49). Capetown.

plants of the companies associated with the Corporation, a similar expansion took place in canning factories and reduction plants operated by other interest groups, principally trawling companies not associated with the Corporation.

The opening up of new markets for fisheries products, owing to conditions created by the war and its aftermath, stimulated the development of the South African secondary industry utilizing fish and crawfish. The Corporation and its associated companies, together with the fishing companies of the other combines in the industry, participated actively in this expansion during the past five years. The demand by the new canneries and fish meal and oil reduction plants created an excellent market for landings by inshore fishermen especially.

Although the South African fisheries are now experiencing a period of relative prosperity, the South African Government decided not to invest for its financial year ending 31 March any additional capital in either "A" or "B" shares because of "the difficult financial conditions" prevailing in general. 4/

Fear is expressed that the secondary industrial expansion might result in an intensive fishing effort, depleting the fish stocks. The Corporation "still has great confidence in the future of the industry. Nevertheless, it feels that during the next few years it would be prudent to adopt a cautious policy regarding development, until such time as further investigation and research have taught us more about the potentialities of our fishing grounds. The keynote of our policy during this period should be consolidation of gains rather than further development ...." 4/

OYSTER CULTURE IN SOUTH AFRICA STUDIED

Soon after its establishment in 1944, the Fisheries Development Corporation of South Africa, Limited (see preceding article), began to study the possibilities of oyster culture in South Africa. As the native oysters occurring along the southern and eastern shores, were not extensively exploited it was felt that if other types of oysters could be introduced and cultivated in certain of the lagoons and estuaries, a valuable addition to the fishing industry would be made available. Apart from an unsuccessful attempt made some years previously, nothing had been done to investigate such possibilities.

Initially, the Division of Fisheries of the Department of Commerce and Industries made a survey of the Knysna Lagoon and found that the salinity, temperature, plankton content of the water, and other conditions appeared to be suitable for oyster culture. Also, a fisheries expert went to Europe and North America to obtain information on the latest oyster culture methods. Later, the experimental planting of native oysters began in Knysna Lagoon and Keurbooms Lagoon, about 25 miles from the city of Knysna. Serious attention was given to the feasibility of introducing the European oyster (Ostrea edulis) because of its superiority over the native oysters.

The experiments carried out near Knysna proved sufficiently encouraging to justify the establishment of a company to commence oyster culture on a modest scale. Thus, in 1948, the Knysna Oyster Company (Pty.), Limited, was founded, the Fisheries Development Corporation holding half the shares and local private interests the other

4/ Op.cit.

half. An expert from the Netherlands, with a wide knowledge and experience in oyster farming in Dutch waters, was engaged to survey the grounds and collect oyster stocks from the neighboring coast in order to obtain oyster spat.

The most recent developments in this undertaking are briefly reported in the Corporation's Fifth Annual Report.5/ During 1949, about 20,000 oysters were brought from Europe by air, with little loss en route, and planted in Knysna Lagoon.

Native oysters have been planted in Saldanha Lagoon, where none exist naturally today but where they were abundant in the past. Indications are that the original populations were destroyed by the intermixture of cold currents from the Antarctic which prevented reproduction. However, conditions are such in Saldanha Lagoon that oysters will live and grow in the environment, even though they do not breed. It is hoped that it may be possible to use Saldanha Lagoon to grow the spat secured from Knysna Lagoon.

The South African experiments bring to mind the successful oyster industry that has been developed on the west coast of North America, principally in the State of Washington, U.S.A., and in British Columbia, Canada, through the introduction of the Japanese oyster (Ostrea gigas). Large scale introduction began in the State of Washington in 1922. Since it is only in years in which conditions are favorable that the introduced species will reproduce in the waters of the Pacific Northwest, large quantities of seed oysters are imported periodically from Japan.

Between 1930 and 1940, the Japanese oyster industry of the United States Pacific coast states became one of the leading sea food industries in that area. Prior to 1930, the yield of oysters amounted to only a few metric tons annually. After that time, the production increased each year, reaching approximately 3,500 metric tons annually in the years prior to World War II. The industry suffered during the war years, as imported seed oysters were not available. However, in recent years the oyster industry has regained its important place in the fishing industry of these states.

PRESENT DEVELOPMENT OF THE VENEZUELAN FISHERIES INDUSTRY

The production of fish has increased appreciably in Venezuela during the past decade, from approximately 10,000 metric tons to over 70,000 metric tons annually. Several government agencies and a Rockefeller organization have played an important part in developing the country's fisheries industry. The government agencies are the Fisheries Service (Servicio de Pesquería) of the Ministry of Agriculture and the Venezuelan Development Corporation (Corporación Venezolana de Fomento). The Rockefeller organization participating in fisheries development is one of four companies financed by the Rockefeller International Basic Economy Corporation and is known as Pesquerías Caribe, C. A.

5/ Fisheries Development Corporation of South Africa, Limited. Fifth Annual Report Covering Period 1 October 1948 to 30 September 1949. Cape Town, Union of South Africa 17 January 1950, 8 pp.

The Venezuelan Development Corporation, the government-owned corporation, was founded in 1947 and immediately set out to increase fish production by improving the fishing fleet, modernizing distribution methods, and promoting increased consumption. One of the first projects was to issue credits to fishermen for motorizing 750 of the fleet, which included 4,300 craft in 1947. Motors installed in 1947 ranged from 9.8 horsepower outboards for smaller craft of 12-18 feet to 42 horsepower marine engines for vessels of 40-50 feet.

The Corporation's program has expanded and according to a recent issue of the Commercial Fisheries Review 6/ the government has a four-point program to modernize the fishing fleet and to increase production. This program is outlined as follows:

1. Supply of outboard motors to those fishermen who still lack them and installation of refrigeration units on credit with easy payment terms, a continuation of the current practice;

2. Construction of 30 larger vessels with Diesel motors, of two types: one 34 feet, the other 26 feet. These vessels will be constructed in the three national shipyards, the Diesels being purchased from local agents. They will then be sold to fishermen for 20 percent cash with the remainder payable in 20 quarterly payments (5 years);

3. Building of three national shipyards financed by the Corporation;

4. Construction of two modern fishing ports: one at Cumana, the other at La Guaira.

Before action was taken by the Corporation to produce ice, little of it was used in the commercial fisheries as a result of the limited supplies and high cost - 15 to 20 U.S. dollars per ton. The fish sold in the markets was of poor quality and not well accepted by the public. For lack of ice, fish was salted to a great extent.

The Venezuelan Development Corporation and the Pesquerías Caribe, C. A., whose programs are similar, 7/ are building a warehouse and refrigeration plant with dock facilities at Puerto La Cruz in the eastern sector. It will have equipment to freeze 20 metric tons of fish daily, to store 400 metric tons of fish, and to produce 30 tons of ice.

Icing stations have also been established by the Pesquerías Caribe, C. A., in Porlamar and Juan Griego on the Island of Margarita. Packers will operate out of Puerto La Cruz, carrying ice and supplies to the icing stations and returning with fish catches made by the local fishermen.

The Pesquerías Caribe, C. A., is supplying the fishermen with motors and ice boxes. To install such equipment, the company has a large shop in Porlamar and plans to construct a small marine railway at this point. To encourage the increased consumption of fish in the domestic market, the company operates modern fish markets

6/ Commercial Fisheries Review (United States Department of the Interior, Fish and Wildlife Service, Washington, D.C.). Vol. 11, No. 12 (December 1949), pp. 53-55.

7/ Frances Taylor. Development of the Pesquerías Caribe, C.A. Proceedings of the Gulf and Carribbean Fisheries Institute, University of Miami, Marine Laboratory, Coral Gables, Florida (July 1949), pp. 58-59.

in Caracas. It also plans to extend the distribution of fresh, frozen, and salt fish to other cities of Venezuela.

The Pesquerías Caribe, C. A., does not intend to bring foreign fishermen as replacements for the local fishermen, but to introduce modern methods of fishing and distribution and build up markets for the fishermen's catches.

THE COMMERCIAL FISHERIES OF PERU

During the past eight to ten years, large investments have been made in the fisheries industry of Peru. New fishing boats, canneries, and storage facilities have been constructed to develop the country's vast fisheries resources. Fish production in 1940 was estimated to be about 12,000 metric tons but by 1948 it had risen to between 30,000 and 40,000 tons annually. An article in the journal Food Industries 8/ suggests that the production can be increased ten times this amount if the modernization of the industry continues to progress as it has during recent years.

Production statistics compiled by the FAO Fisheries Division for the years 1941 to 1947, and based on information supplied by the Government of Peru, are as follows:

Total Catch (in Metric Tons)

1941	1942	1943	1944	1945	1946	1947
11,889	21,063	26,725	30,268	31,958	27,657	30,778

The principal species of commercial importance taken off the coast of Peru are: yellowfin tuna (atún) - Thunnus macropterus; bonito (bonito) - Sarda spp.; skipjack (barrilete) - Katsuwonus pelamis; herring (machete) - Ethmidium and Ilisha spp.; anchovy (anchoveta) - Engraulis and Anchoa spp.; swordfish (albacora) - Xiphias gladius; and mackerel (caballa) - Pneumatophorus peruanus.

The modernization of the Peruvian fishing industry started about eight years ago. Old-fashioned open cockpit fishing vessels were gradually replaced by new type motorized boats equipped with modern nets. In 1948, the Fisheries Bureau of the Ministry of Agriculture (Dirección de Pesquería del Ministerio de Agricultura) estimated that there were 2,600 fishing boats of all types operating in Peruvian waters. Of this total, the bonito and tuna fishing fleet consisted of about 300 boats, the majority having an average length of 30 feet, but even larger boats being used. The mackerel fishery employed about 200 boats.

The fishing vessels work from 32 principal ports along the coast. At least six ports each contribute 1,000 metric tons or more of fish to the annual catch, the richest fishing grounds lying within a radius of 120 miles from the ports of Callao, Sechura, Ilo, Pisco, Chimbote, and Cabo Blanco.

8/ John Wilhelm. "Peru Fishing Industry Undergoing Modernization." Food Industries (New York: McGraw Hill and Co.), Vol. 20, (March 1948), pp. 388-390.

Until the early 1940's, Peru did not export fishery products. Now, a large amount of canned yellowfin tuna, bonito, and skipjack - the three species forming the bulk of the commercial catch - are exported to the United States of America. However, salted mackerel, as well as canned herring and bonito, contribute extensively to the domestic markets.

TUNA SURVEY OF NORTHERN AUSTRALIA

A survey of the resources of tuna and other pelagic fish in the waters off the northern coast of Australia was conducted in 1949 by the Fisheries Division of the Commonwealth Scientific and Industrial Research Organization (CSIRO). 9/

Two vessels were employed in the exploratory work, which was carried on from July to October. One vessel operated from Thursday Island in Torres Strait westward to longitude 125 degrees at York Sound, the other along the rest of the Western Australia coast to North West Cape. The area covered consisted of a quadrant in the northern part of the Gulf of Carpentaria, the entire coast line from Cape Wessel in Arnhem Land to North West Cape, and the southern parts of the Timor Sea, including the greater part of the continental shelf with its banks and reefs.

As neither vessel was fitted for purse seining or live-bait fishing, both craft depended on trolling gear to carry on the experimental tuna fishing. Those in charge of the work realized that trolling results alone would have little commercial significance, as the two species expected to occur commonly in the area - the northern bluefin tuna (Kishinoella tonggol) and the mackerel or little tuna (Euthynus alletteratus) - do not take the hook readily. However, it was hoped that sufficient numbers would be caught with such gear to confirm identification of the schools seen and to obtain information on size range, maturity, feeding habits, and other biological data. Each vessel trolled four to six lines, with lures consisting of aluminum jigs, feathers, red and white macramé cord, and skin of the whitefish (Chorinemus lysan). The weather encountered was suitable for purse seining during most of this period. The best weather occurred during the time fishing was done between North West Cape and Timor, where the sea was calm during 50 of the 57 days of operation. During 37 of the 53 days spent in the region between Cape Wessel and longitude 125 degrees, conditions were suitable for seining. In the eastern area, between Arnhem Island and Thursday Island, southeast trade winds are prevalent during the winter months, and weather conditions encountered during 10 of the 12 days in this area were not suitable for purse seining.

Of the five species of tuna taken by the two vessels by trolling, the northern bluefin tuna and mackerel tuna were captured most frequently. Other species, listed in order of occurrence, included the skipjack or striped tuna (Katsuwonus pelamis), the dog-tooth tuna (Gymnosarda nuda), and the yellowfin tuna (Neothunnus macropterus). The bluefin tuna and mackerel tuna are tropical and subtropical and extend down both sides of the Australian continent. The dog-tooth tuna was taken in the locality of the Woodbine Bank and at Cartier Island. Previously, this species had only been taken off Northern Queensland. The yellowfin tuna was found only near Timor, while the skipjack tuna, though more generally distributed in the Timor Sea area, occurred sparsely.

9/ D. L. Serventy. Fisheries Newsletter (Department of Commerce and Agriculture, Commonwealth Director of Fisheries, Sydney, Australia), Vol. 9, No. 3 (April 1950), pp. 18-20.

The vessel engaged in the eastern sector of the surveyed areas encountered schools over most of the area explored. It was estimated that many tons could have been taken with a purse seine. Behavior of the fish to trolling lures varied greatly. Many schools were entirely indifferent to the ship or its lines. At other times, catches were made even when no schools were visible at the surface. It was found that northern bluefin tuna could not be caught with lures when actively feeding, but that they would take the artificial lure when searching for food in dispersed schools.

The vessel which operated to the west of York Sound made disappointing catches, as compared with those made by the other craft in the eastern sector. Tuna appeared to be scarce in the western part of the Timor Sea. However, many schools were encountered from Red Bluff, although catches were negligible.

The offshore waters still remain to be explored to determine how far the tuna schools extend beyond the waters of the continental shelf, to which the present survey was limited. There is some evidence, from the presence of sea birds on the steamer route to Colombo, that tuna may be found in the offshore waters as far west as longitude 170 degrees. These birds are frequently associated with tuna schools in inshore waters.

INSTITUTE OF OCEANOGRAPHY OF THE UNIVERSITY OF BRITISH COLUMBIA

In recent years, the increasing interest in the problems of the sea has created a demand in Canada for trained oceanographers to undertake investigations in this field. The Institute of Oceanography of the University of British Columbia at Vancouver was organized to meet these needs. The Institute is supported in part by the Defense Research Board of Canada, and the Joint Committee on Oceanography, the latter body representing the interests of the Royal Canadian Navy, the National Research Council, the Fisheries Research Board of Canada, the Hydrographic Service of the Department of Mines and Resources, and the University of British Columbia.

The University's part of the program of the Institute represents the co-operative effort of three of its departments - Chemistry, Physics, and Zoology. Their object is to train students at the graduate level in one or more of these three branches of oceanographic research. Besides this educational function, the University also carries on fundamental research in oceanography.

Shore facilities for study and research are situated on the university campus. Opportunity for investigation, observation, and collection at sea is possible for the staff and students of the Institute through the facilities and research ships of the Pacific Oceanographic Group of the Joint Committee on Oceanography, and the Pacific Naval Laboratory, located respectively at Nanaimo and Esquimalt, British Columbia.

The Institute is directed by a committee of six members representing the co-operating departments at the University and the supporting organizations. The committee also reviews the qualifications of candidates entering the field of oceanography and passes on the professional competence of graduating oceanographers in oceanography.

The academic training offered is available to students registered in the Faculty of Graduate Studies who are proceeding toward either a degree of Master of Arts (in

science) or Doctor of Philosophy. Students may major in chemistry, physics, or zoology, and their research is normally undertaken in one of these fields of oceanography.

VOCATIONAL TRAINING IN THE FISHERIES INDUSTRY OF NORWAY [10/]

Norway has done a great amount of work in recent years on the development of vocational training for fishermen and for shore workers in the fishing plants.

At present it has three permanent schools for fishermen. The first of these was established in 1939 at Aukra, near the town of Molde; the second in 1946 at Bodø in northern Norway; and the third in 1947 in Florø (north of Bergen). A new school of the same type, but larger than any of the three mentioned, is to be set up at Honningsvaag in the province of Finnmark. This school, which will be the first one built as a vocational school for fishermen, is a gift from the town of Oslo in connection with reconstruction work in northern Norway, after the German troops had devastated it during their retreat in 1944/45.

In the three schools so far established, the curriculum includes a "master fisherman course" which leads to a coastal skipper's certificate (first class). Candidates must also pass an examination in fisheries subjects. The course extends over a period of ten months, a little more than half of which time is devoted to instruction in navigation and related subjects, while the rest is divided between fisheries subjects (from practical and biological points of view) and general education (including bookkeeping, civics, and hygiene).

Specially arranged excursions on research vessels and fishing vessels, as well as visits to different industrial establishments, are a part of the instruction. Lectures are also regularly given by visiting research workers and by officials of the fisheries administration and of the fishermen's organizations. These lectures are considered very important as a means of keeping the schools informed of new developments.

The school at Florø also offers training for cooks for the fishing fleet, giving two such courses each year. This training particularly stresses the practical aspects of the subject. In addition, it provides instruction in bookkeeping and hygiene.

Together, the three schools are able to train from 90 to 100 master fishermen and about 20 cooks each year.

In the last three years, courses for master fishermen, cooks, and engineers have also been held in Bergen on board the merchant marine training ship "Statsraad Lehmkuhl." Practically the same curriculum as that offered in the permanent schools has been followed here. Plans have now been worked out for a permanent school near Bergen.

10/ Prepared by H. Tambs-Lyche from Norway, Fiskeridirektøren, Fiskeri-Undervisningen 1948-49 (Aarsberetning vedkommende Norges Fiskerier 1949 - Nr. 3). Cammermeyers Boghandel, Oslo, 1950.

So far, Norway has only one establishment for instruction and training in the handling and preparation of fish. This school, situated in Vardø in the province of Finnmark, is attended by young people who have selected fish preparation as a trade, and it has a capacity for training about 40 students a year. The curriculum includes a three months' course in the autumn, in which the main emphasis is on the handling of fresh fish, and a five months' course during the winter and spring, in which subjects such as salt curing and drying of fish also play an important part. These courses aim chiefly at giving practical training, but include some theoretical instruction, chiefly in bookkeeping, technology, and biology.

In the four schools mentioned above, instruction and board and lodging are provided free of charge, and travel expenses to and from the school are refunded.

In addition to the schools, shorter courses are given. Some of these are itinerant and others are held permanently at different institutions. The following courses were given during the financial year 1948/49:

	Courses	Students
Navigation	14	186
Radiotelephony	21	292
Bookkeeping	8	103
Cooking	6	28
Echo sounding	2	42

In the coming years the education and training of fishermen and of others interested in the fishing industry will be further consolidated and extended. For instance, plans are now being worked out for intensifying instruction in the handling and curing of fish and for establishing organized training in the operation of fishing craft engines.

And last but not least, plans for an academic education in fisheries in co-operation with the universities have been worked out in recent years, and they will probably be realized to some extent during the autumn of 1950 or the spring of 1951.

STATUS OF FISH PONDS IN THE UNITED STATES OF AMERICA

In Southeast Asia and Europe, ponds are constructed principally for the production of fish for food. Such is not the case in the United States of America, where the production of food from ponds is a minor consideration. The importance of ponds in the United States lies first in their recreational value for sports fishing and secondly in their use for stock-watering, water storage, and the control of soil erosion.

A paper by H. S. Swingle of the Alabama Agricultural Experiment Station 11/ outlines some of the recent developments in pond management in the United States. During the past 15 years, approximately 100 times as many ponds were constructed in the United States as were built in the preceding two centuries. It is estimated that approximately 1,111,000 ponds with a total area of 530,000 acres are now in use. Of this number

11/ H. S. Swingle. "Some Recent Developments in Pond Management." Transactions of the Fourteenth North American Wildlife Conference, Wildlife Management Institute, Washington, D.C., 1949, pp. 295-312.

about 8,000, with an area of 40,000 acres, were constructed prior to 1935. Many of these ponds were built for stock-watering and other purposes, but thousands were constructed for the principal aim of providing sports fishing.

While the original impetus to the pond-building program for fish production was supplied by the experimental work on pond construction and management begun in 1934 by the Alabama Agricultural Experiment Station of the Alabama Polytechnic Institute, its extensive development and expansion to all parts of the United States was made possible by the co-operative assistance rendered to pond owners by various federal and state government agencies.

In many regions, yields from the ponds are low because only a small percentage are being properly managed. Often, trained technicians are not available in these areas to offer instruction to the owners. There is a real need for trained personnel in this field, since the task of teaching fish culture practices to approximately a million new pond owners is tremendous. Under these conditions, some failures are expected, but increased interest and continued construction of ponds indicates that the over-all program has been a success, particularly from the fisherman's point of view. Ponds are providing better fishing than has been enjoyed in streams and lakes in many sections of the country. They have also brought fishing to many sections where formerly none existed.

The greatest production from fish ponds can be obtained from species of fish which feed largely on microscopic plants. However, such species are not suitable in the United States where the fishermen want a sports fish and, in addition, a fish relatively free from bones. Of the hundreds of species found on the North American continent, only a few are at present desirable, the most important being largemouth bass (Micropterus salmoides), bluegill (Lepomis macrochirus), red-ear sunfish (Lepomis microlophus), white crappie (Pomoxis annularis), and black crappie (Pomoxis nigromaculatus). Of the species or combinations found to be usable in ponds, the bluegill-largemouth bass combination has given the highest production and is still the best for most of the United States.

Research is being continued in an increasing number of states on one or more phases of pond management, but Alabama is one of the principal states with extensive facilities for pond research. Mr. Swingle states that the Alabama Agricultural Experiment Station has 134 experimental ponds, with a total area of 140 acres, which are being used for research purposes. Most of the pond fish research being done in the United States is directed towards obtaining better pond species and more efficient combinations of fish for sports fishing. Little is being done to develop fish production from ponds on a commercial basis. Production of minnows for bait is at present one of the few commercial applications in this field.

Fisheries Division Activities

FAO MEETING ON HERRING TECHNOLOGY

FAO is calling a meeting of fisheries technologists to be held in Bergen, Norway, 24-29 September 1950, to discuss problems arising in herring processing and utilization.

The gathering is an outcome of the FAO Herring Meeting held in The Hague, Netherlands, 29 August-1 September 1949. One of the conclusions of this meeting was that, in view of the existing trend toward a surplus in the herring industry, efforts should be made to find new outlets for herring products. The forthcoming meeting in Bergen will discuss all modern improvements in herring technology and utilization which may contribute toward making processing more efficient and the products more easily available.

One of the principal subjects for discussion will be the possibility of preparing herring - a cheap source of protein - as an inexpensive food product which would suit the tastes of protein deficient populations in areas such as Asia and Africa, and still be priced sufficiently low to be acceptable to them. This undertaking will, of course, not be easy, since food habits differ widely and purchasing power in these areas is generally at a low level. However, the purpose is to assemble whatever information is available on experiments already carried out, and to present additional information from the areas concerned on food habits and the prices consumers can pay.

The meeting will also deal with other aspects of herring technology - such as canning, freezing, and the manufacture of herring by-products - in which many new developments have taken place.

The following countries have been invited to send representatives: Belgium, Canada, Denmark, Finland, France, Germany, Ireland, the Netherlands, Norway, Portugal, Sweden, the United Kingdom, and the United States of America.

In addition to government officials, the meeting on herring technology will be open to technologists and other interested people from the fishing industry. Persons who wish to participate should contact the appropriate government office in their country or the FAO Fisheries Division for information.

Immediately after the meeting, fisheries technologists nominated by governments will consider the desirability of, and suggest a means for, continuing co-operation among fisheries technologists on a regional basis.

Each of the technical sessions will be introduced by the presentation of a paper summarizing the latest research and technical developments dealing with the subject under consideration. These papers will, insofar as possible, be distributed to participants before the meeting and only be given in summary at the beginning of the session. The greater part of the session will thus be taken up by discussions and statements regarding specific problems brought up by the participants. In addition to the papers listed below, indications have been received that special contributions are being prepared by Thordur Thorbjarnarson, Iceland; S. W. F. Hanson, Ministry of Food, and C. F. Hickling, Colonial Office, United Kingdom; and Sven Lassen, U.S.A.

As one of the main purposes of the meeting is to evaluate possibilities for the marketing of herring products in countries with a poor supply of proteins, the first session will be devoted to a general discussion of this topic. Discussions regarding possibilities for the marketing of the various special products, such as dried herring, canned herring, etc., will take place mainly on the following days in the sessions concerned with these products. The tentative program of the meeting follows.

Sunday, 24 September

2 to 8 - Registration

8:00 - Georg Borgström, Sweden: "Fisheries and the World's Food Problems"

- Showing of the FAO film "The World is Rich"

Monday, 25 September

Morning - General Session

9 to 10 - Registration

10:00 - Speech by Norwegian government representative

10:15 - Speech by representative of the Director-General of FAO

10:30 - Election of chairman and appointment of steering committee

11:00 - Olav Notevarp, Norway: "Herring as Food and Industrial Raw Material"

11:30 - G.A. Reay, United Kingdom: "The Utilization of Herring"

Afternoon - Possibilities for finding new markets for herring products

2:00 - G.M. Gerhardsen, FAO: "Factors Influencing Supply of and Demand for Herring"

Monday, 25 September - Afternoon (Cont'd)

2:30 - H.H. Goodwin, Scotland: "Efforts to Increase Sales and Exports of Herring Products"

3:00 - G.L. Kesteven, FAO: "Possibilities for Exporting Herring Products to Asia and the Far East"

Tuesday, 26 September

Morning - Salted and spiced herring, herring delicatessen

9:30 - D.J. van Dijk, the Netherlands: "Salted and Spiced Herring"

11:00 - Georg Borgström and Ewald Luckey, Sweden: "Herring Delicatessen, Marinated Herring, etc."

Afternoon - Smoking, drying, and dehydration

2:00 - C.A. Cutting, United Kingdom: "The Smoking and Drying of Herring"

3:30 - Frode Bramsnaes, Denmark: "Hot Smoking of Herring"

Evening

7:30 - Visit to the Norwegian Directorate of Fisheries' Chemical-Technical Research Institute. Demonstrations of salted and dried herring products, herring delicatessen, and Oriental fishery products.

Wednesday, 27 September

Morning - Canned herring

9:30 - J.G. Huntley, United Kingdom: "Canning of Herring"

Afternoon - Fresh and frozen herring

2:00 - G.A. Reay and J.M. Shewan, United Kingdom: "The Handling and Preservation of Fresh Herring"

4:00 - Eirik Heen, Norway: "Frozen Herring"

Thursday, 28 September

Morning - Possibilities for finding new markets for herring products

9:30 - Continued discussion of the possibilities for developing new herring food products

Thursday, 28 September

Afternoon - Manufacture of non-food products from herring

2:00 - Gudmund Sand and Trygve Sparre, Norway: "New Reduction Processes"

5:00 - Visit to the Herring Oil and Herring Meal Industry's Research Institute

Friday, 29 September

Morning - Herring oil

9:30 - J.A. Lovern, United Kingdom: "The Production of Herring Oil"

Afternoon - Protein products from herring

2:00 - Gudmund Sand and Trygve Sparre, Norway: "Fish Solubles"

4:00 - Closing Session

SECOND ANNUAL MEETING OF THE INDO-PACIFIC FISHERIES COUNCIL

The Director of the FAO Fisheries Division, Dr. D. B. Finn, represented the Director-General at the second annual meeting of the Indo-Pacific Fisheries Council in Cronulla, Australia, 17-28 April. The meeting, which was opened by the Honorable P. C. Spender, Australian Minister of State for External Affairs, was attended by 35 representatives from 11 of the 14 member governments of the Council (India, Ceylon, and Burma not being represented), and representatives of SCAP, the South Pacific Commission, and UNESCO.

The Council elected as its chairman Dr. J. D. F. Hardenberg of Indonesia and as its vice-chairman Dr. D. V. Villadolid of the Philippines. Among the outcomes of the meeting are:

(1) Arrangements for providing the FAO Secretariat with information concerning national fisheries programs and for enlisting the services of experts to be available for consultation by workers in the region;

(2) A report for use by governments on preparing applications for aid under the Expanded Technical Assistance Program;

(3) Arrangements for co-ordination of the work being done by individual countries on the tuna fisheries in the area (Countries such as Australia, Indonesia, the United States, and Japan all have programs of research on these species. Steps were taken to correlate the work of these and other countries and to standardize scientific measurements and techniques used in the investigations.);

(4) Arrangements for furthering the expansion of fish culture in the Indo-Pacific region. Special emphasis was placed on the effect of the transplantation of species from one area to another.

(5) Collaboration with the South Pacific Commission. (Dr. Hardenberg is representing the Indo-Pacific Fisheries Council at a meeting of the South Pacific Commission's Research Council in Sydney, Australia, in August.)

CO-OPERATION WITH OEEC

The Chief of the Economics and Statistics Branch of the FAO Fisheries Division, Mr. G. M. Gerhardsen, has been assigned to the Organization for European Economic Cooperation to head a group conducting an examination of the factors hampering the marketing of fish in Europe.

The apparent overproduction of fish in Europe, as compared with actual demand, has become a matter of great concern. Although the fish which have been caught have been disposed of in some way or another, the outlets have been of an alarmingly unstable character.

When the OEEC Subcommittee on Fisheries considered the situation in July 1949, it felt that "there is a considerable scope for an over-all increase in consumption" but that there are certain factors which obviously limit the possibilities. The subcommittee found that it was not possible to frame specific proposals for increased consumption of fish without first making a more detailed survey.

Upon the unanimous recommendation of the principal European fisheries administrators, it was decided that OEEC should seek the services of the Chief Economist of the FAO Fisheries Division for six months to act as head of a team of experts, who are to be nominated by the countries concerned. This team will conduct a survey of the factors limiting the consumption of fish in Europe, so that the necessary adjustments may be made to bring about an increased consumption. The survey will deal with such things as the structure of the distribution trade, transport, handling and storage facilities, structure and behavior of prices and finance, seasonal fluctuation in fish supply and quality, consumer preference, and, finally, government policy on quotas, import duties, and local taxation. It is felt that practical information on these matters would very likely make it possible for the governments themselves to make adjustments that would lead to the desired increase in consumption of fish and fisheries products.

Notes on Publications

Second Annual Report of the Fisheries Prices Support Board 1948-49. Ottawa, Canada, 1949. 11 pp., appendix. In English.

This annual report is introduced by short references to the Fisheries Prices Support Act, 1944, of Canada and to the membership and staff of the Fisheries Prices Support Board. The economic conditions prevailing in Canadian fisheries during the fiscal year 1948-49 are reviewed. Requests for action by the Board and support programs for prices of East Coast fish and of Manitoba Lakes frozen fish are analyzed. Research activities on income, costs, and other economic factors in the processing branches, as well as domestic and foreign markets, are discussed.

Fifth Annual Report of the Fisheries Development Corporation of South Africa, Limited, 1 October 1948 to 30 September 1949. Capetown, Union of South Africa, 1950. 9 pp. In English and Afrikaans.

The fifth annual report of the South African government-sponsored corporation reviews the rapid development of the local fisheries during the five-year period of its existence, the various investments made by the Corporation under the "A" and "B" share purposes as defined by Act 44, 1944, of the South African Legislature, the fish meal and oil industry and markets, miscellaneous branches of the industry, oyster culture in South African lagoons, housing programs for fishermen, a boat-financing scheme, training of fishermen, and the balance sheets of the Corporation.

Norges Fiskerier 1945 (Annual Fisheries Statistics of Norway, 1945). Fiskeridirektøren, Norges Offisielle Statistikk, Vol. 10, No. 199, H. Aschehoug and Co., Oslo, Norway, 1949, 153 pp. In Norwegian.

This publication contains detailed information, by municipalities, of the quantity and value of landings of all species of fish which are caught commercially in Norway. It also gives statistics on craft, gear, and fishermen, as well as shore facilities for processing, etc., but these are not as detailed geographically as the landings statistics. For the most important sections of the fishing industry, data on utilization of catch and on participation by men and craft are also given. The introduction contains a detailed textual description of the most important seasonal operations based on reports from fisheries officers who are stationed in the field.

The Codfish Industry in Northern Portugal. Randall T. Klein. Fishery Leaflet 367. United States Department of the Interior, Fish and Wildlife Service, Washington, D.C., U.S.A., 1950. 23 pp. In English.

This leaflet describes the cod-fishing and -curing industries of northern Portugal and furnishes data on: the fishing seasons; craft, gear, equipment; methods of fishing and curing; port facilities; personnel, contracts, wage scales, insurance and welfare

schemes; the functions and operations of the various corporative institutions concerned with the fisheries industry; distribution patterns; price policies; by-products; and operational difficulties faced by the industry. Statistics on production, imports into Portugal, craft, and fishermen are given for 1939-48.

Sales Patterns for Fresh and Frozen Fish and Shellfish, 1936 and 1946. R.A. Kahn and W.H. Stolting. Fishery Leaflet 365. United States Department of the Interior, Fish and Wildlife Service, Washington, D.C., U.S.A., 1949. 101 pp., 15 illus., appendices. In English.

This leaflet presents the results of two surveys for the purpose of determining sales patterns (monthly ranking order in sales of principal species) for fresh and frozen fish and crustaceans and mollusks in over 60 cities of the United States. The results of the 1936 survey were published as Memorandum S-346 by the former United States Bureau of Fisheries. The 1946 survey is an improved and refined version of the earlier study. Among the data presented are a description of the survey methods, cities and years surveyed, species and types of products reported, and detailed and condensed summaries and charts. The data for the individual cities indicate the relative importance of the principal species and commodities, with remarks on changes between 1936 and 1946. Data on the origin of the supplies furnished to the cities are also included.

Information Sources for Students of Commercial Fisheries. R. Paul Elliott. Fishery Leaflet 362. United States Department of the Interior, Fish and Wildlife Service, Washington, D.C., U.S.A., 1950. 19 pp. In English.

This compilation is intended to make readily available to the student of the commercial fisheries of North America a list of the principal publications on the subject. The various sources of information are grouped under several headings, including directories, libraries, technical journals, trade journals, statistics, and aspects of the fisheries industries.

Jaarcijfers Over De Visserij Gedurende Het Jaar 1948 (Annual fisheries statistics for the year 1948). Reports and communications of Directorate of Fisheries, Ministry of Agriculture, Fisheries and Food Supply, The Hague, Netherlands, 1949. 82 pp. In Dutch. Tables in Dutch and English.

This annual survey presents statistics on the fisheries of the Netherlands. For the various types of fishing craft, it gives the number, place of registration, and registered gross tonnage; it also gives the quantities and values of landings, by species, made by Dutch and foreign craft from the fishing grounds.

Additional data cover in detail the principal branches of the Dutch fisheries, which consist of sea fisheries (drift net fisheries, trawl fisheries, and Danish seine fisheries); inshore fisheries (in the Dollart and Eems, Lauwer Sea, Wadden Sea, South-Holland estuaries and Zealand estuaries); Lake IJssel fishery; and the fishery for migratory fish in the rivers and South-Holland and Zealand estuaries. The data include number of enterprises, number of weeks of operation, number of fishermen, average price of fish per kilogram, number of voyages, kinds of fishing gear used, etc.

A group of tables surveys salted herring exports, by herring exporting centers, to different countries according to the sizes of containers. Netherlands imports and exports of all fisheries products by quantity (in kilograms net weight) and value (Dutch florins) are also given.

Fishery Statistics of the United States 1946. A. W. Anderson and E. A. Power. Statistical Digest No. 19, United States Department of the Interior, Fish and Wildlife Service, U.S. Government Printing Office, Washington, D.C., U.S.A., 1950. 265 pp. In English.

This federal statistical digest, which is compiled and published annually to present statistical information on the commercial marine and inland fisheries of the continental United States of America and Alaska, includes for the first time data on the fisheries of Hawaii. Statistical data are given on craft, gear, and fishermen; quantities and values of landings (catch) by species; output of manufactured fisheries products by "manufacturing establishments" and by "fishermen"; production of canned packs by species and types, packaged products; holdings of frozen fish, crustaceans, and mollusks; and external trade (imports and exports) in detail for the United States customs area (U.S.A., Alaska, Hawaii, and Puerto Rico).

Other sections of the publication summarize details on the fisheries in major regional divisions. Complete data on the total catch in all regions for certain of the principal species (cod, haddock, halibut, mackerel, menhaden, pilchard, rosefish, salmon, and tuna) are presented and analyzed. Finally, the statistical procedures are reviewed and a glossary of common and scientific names of the species is provided, followed by a pictorial section and a list of statistical publications on fisheries.

Hva Gir Fisken Oss? (What does the fish give us?) Økt Innsats, Nr. 1, 1950. Sverre Kildahls Boktrykkeri, Oslo, 1949. 144 pp. In Norwegian.

This publication is a collection of short articles of a general nature written by experts in the Norwegian fisheries administration and in the trade. It deals with subjects such as the natural conditions for fishing, the economic importance of fisheries, herring fishery, cod fishery in Lofoten and in Finnmark, mackerel fishery, salmon and cod fishery, fisheries freezing plants and refrigerated warehouses, regulations of fisheries exports, the domestic marketing of fish, exports of fisheries products, frozen fish industry, how klipfish is produced, fish as food, economic conditions of fishermen and their need for capital and financing, use of the internal combustion engine and radio in the fisheries industry, new fish specialties, the fish-canning industry, the fishing fleet, and trawling.

Handbuch der Fischkonservierung. (Handbook of Fish Preservation). Der Fisch, Vol. III. Otto Wille. Published by Rudolf Baader; Der Fisch, Rotloescherstrasse 31, Luebeck, Germany, 1949. 729 pp., bibl. In German.

This book gives a very complete description of the various fish-processing methods, especially of those in use in Germany. The chapters on such topics as fish smoking, fish marinating, etc., are particularly useful, as few descriptions of these processes exist.

La Pesca de Arrastre en Pareja (Fishing with the "Pareja" trawl). José M. Navaz y Sanz. Sociedad de Oceanografía de Guipúzcoa, Publication No. 5, Primitiva Casa Baroja, San Sebastián, Spain. 1948. 28 pp., 23 illus., bibl. In Spanish.

This publication gives a description of the "Pareja" trawl and its use, with detailed pictures showing the fishing vessels, the setting of the trawl, and the net itself.

Report on a Fisheries Project for Costa Rica. Mogens Jul. Food and Agriculture Organization of the United Nations, Washington, D.C., U.S.A., September 1949. 128 pp., bibl. In English.

This report was prepared at the request of the International Bank for Reconstruction and Development by the FAO Fisheries Division. It gives a description of the present fishing industry of Costa Rica, with particular emphasis on the local distribution of fresh fish and on the extensive tuna fishing for export. Suggestions are put forward for the study of certain fishing industries and related activities which are judged to offer promising opportunities. Appendices give various fisheries statistics, translations of the fisheries laws of Costa Rica, and a bibliography of materials.

World Fisheries Year-book 1949. Edited by Harry F. Tysser. British-Continental Trade Press Ltd., 222, Strand, London, England, 1949. 457 pp. In English.

This yearbook serves mainly as a directory of exporters and importers of fisheries products in several countries, and lists suppliers to fisheries, fish-processing equipment, etc. In addition, it contains a brief world survey of the condition of the fisheries industry. Its various technical articles include a detailed description of modern fishing vessels and engines, wireless equipment, echo-sounding equipment, etc. The yearbook also contains various brief articles on fish processing and preservation, a very well documented article on problems of fish preservation for tropical countries, and an article on fish meal and oil manufacture and oil refining. A calendar shows the fishing season for various species in different countries.

Outlines of Food Technology. H. W. von Loesecke. 2nd Edition. Reinhold Publishing Corporation, 330 West 42nd Street, New York, N. Y., U.S.A., 1949. 585 pp. In English.

The second edition of this textbook on food processing is particularly suited for courses in food technology, as its 15 chapters cover the whole field in a concise manner.

To the fisheries technologist the following chapters are of special interest:
1- The tin can and the glass container (25 pp.); 6- Fish and shellfish (30 pp.); and 15- Preservation of foods by freezing (35 pp., three of which refer specifically to fish).

Index to the Literature of Food Investigation. Agnes Elisabeth Glennie. Vol. 17, No. 2 (September 1945). H.M. Stationery Office, London, 1949. 181 pp. In English.

This publication continues the series of indexes which, discontinued during the war, was replaced in January 1949 by Food Science Abstracts. In order to round out the series, the Department of Scientific and Industrial Research is continuing the

publication of the index to cover the intervening period up to 1949. The present volume contains a considerable number of abstracts of articles on fish processing, etc., most of them published in 1943-44.

Regulations for the Inspection of Shrimp. Food and Drug Administration of the Federal Security Agency, Washington, D.C., U.S.A. Mimeographed draft, April 1950. 16 pp. In English.

The Food and Drug Administration proposes to offer inspection facilities to any United States packers of shrimp in the following forms: canned; cooked and peeled, iced or frozen; raw headless, iced or frozen; raw peeled, iced or frozen; or any specialty product of which shrimp is the principal ingredient. The sanitary and operating conditions under which the products may be prepared and processed are laid down in the regulations, as well as the coding and labeling requirements. Provisions are made for the issue of inspection, warehousing, and export certificates, by the inspector assigned to each plant. A sclae of fees for the inspection of various products is included in the draft.

An Annotated Bibliography of Oysters (with pertinent material on mussels and other shellfish and an appendix on pollution). J. L. Baughman. The Texas A and M Research Foundation, The Agricultural and Mechanical College of Texas, College Station, Texas, U.S.A., 1948. 794 pp. In English.

The bibliography refers to approximately 6,000 articles and scientific papers published on oysters and other shellfish throughout the world, from the middle of the nineteenth century until 1947. The annotations presented were abstracted from the original papers by the author, or were taken from abstracts appearing in either Chemical Abstracts or Biological Abstracts. Papers are listed alphabetically by author and there are subject and author indexes. Although there are omissions, as admitted by the author, it is the most complete bibliography on the subjects covered. Only 250 copies were published, but it is expected that a second edition will be printed to give the work wider distribution and to bring it up to date.

How Can Statistics Increase the Catch? Clarence P. Idyll. Education Series No. 3. University of Miami, Marine Laboratory, Coral Gables, Florida, U.S.A., 1949. 19 pp., illus. In English.

This education pamphlet deals with the application of biological statistics in the management of fisheries resources. After broadly defining fisheries statistics as those on (1) total production, (2) location of catch, (3) how fish are caught, and (4) amount of effort, the writer explains their use in determining changes in abundance of fish stocks and in suggesting regulatory measures. The discussion then deals with methods used in the collection of the statistics and their usefulness to the fishing industry. Finally, the necessity of acquainting the industry with the need for a statistical system is stressed, since the active co-operation of the fishermen and fish dealers is essential to the successful operation of such plans.

Tabellariske Oversikter over Lofotfiskets Lønnsomhet 1946-49 og Tidligere Undersøkelsesaar (Cost of Fishing Operations at Lofoten Islands 1946-49 and During Earlier Years of Research). Fiskeridirektøren, Aarsberetning vedkommende Norges Fiskerier, 1949, No. 5. Cammermeyers Boghandel, Oslo, Norway, 1949. 27 pp. In Norwegian.

This report contains tables from the sample investigation, started in 1936, on the cost of fishing operations at the spawning cod fisheries at Lofoten Islands in Northern Norway. It is based on information received from fishermen accounting for 5 to 10 percent of the total catch of this species.

Utilizing Stock Tanks and Farm Ponds for Fish. Marion Toole. Bulletin No. 24. Texas Game, Fish, and Oyster Commission, Austin, Texas, U.S.A. (1948?). 45 pp., 20 fig. In English.

The author covers practically all phases of farm pond fish culture, from the construction of the pond to the species of fish being reared in the ponds of the State of Texas. The species named are all carnivorous in feeding habits.

Annual Report for the Year 1948 and Short Papers. Institute of Fresh-Water Research (Drottningholm). Report No. 29, Fishery Board of Sweden, Lund, Sweden, 1949. 152 pp. In English.

The director gives the history and functions of the Institute of Fresh-Water Research and outlines the investigations being undertaken. Included in his report is a bibliography of the scientific papers published by the Institute since its inception, together with other articles written by his staff and dealing with fresh-water problems. The current research program includes studies of the production of bottom and plankton animals, the relationship between food and fish production, the introduction of new fish species for improving production of certain lakes, testing the effectiveness of artificial propagation, mutants in fish, control of fish populations, studies in speciation of fish, effects of hydroelectric and other dams on fish populations, and the preservation of fish nets. Following the director's report there are twenty short papers dealing with the investigations of the Institute.

Transactions of the Fourteenth North American Wildlife Conference. Wildlife Management Institute, Washington, D.C., U.S.A. 1949. x + 638 pp. In English.

The 65 papers presented at the Fourteenth North American Wildlife Conference in March 1949, along with the discussions from the floor, are printed in these Transactions. While most of the papers are concerned with problems related to wildlife management, 11 deal with fresh-water and marine fisheries. Subjects included are recent developments in pondfish management in the United States, present status of the commercial fisheries of the Great Lakes, utilization of seaweed resources in the United States, conflicting interests in marine fisheries, conserving the Alaska fur seals, conservation of the Fraser River (British Columbia) salmon runs, and the fisheries research program of the United States research vessel "Albatross III" on the Atlantic coast.

The California Sardine Fishery - Review and Analysis of the Biological, Statistical, and Environmental Information about the California Sardine. Paul G. Pinsky and Wayne Ball. Issued by International Fishermen and Allied Workers of America (Local 33 (CIO), San Pedro), Fishermen's Cooperative Assocation of San Pedro, and California Fish Canners Association (Terminal Island), San Francisco, California, U.S.A., April 1948. iii + 84 pp., 12 exhibits. In English.

The study is the result of an independent review and evaluation of the various research investigations dealing with the California sardine (Sardinops caerulea). The report is divided into (a) general survey of research work, (b) general survey of the information derived, (c) examination of the research work, (d) the gaps in the present knowledge, and (e) conclusions and recommendations. Assuming that the research programs undertaken by the agencies concerned are designed to obtain information for the regulation of the sardine fishery to secure the optimum sustained yield, the work of each agency is examined with reference to the significance of the results in the light of this objective. Then the over-all information gathered by the agencies is related to the objective in terms of the important gaps remaining in the knowledge of the sardine fishery. The report also contains a classified bibliography of material dealing with the California sardine.

Egyptian Fisheries. John Panos and Quincy F. Roberts. Fishery Leaflet 363. United States Department of the Interior, Fish and Wildlife Service, Washington, D.C., U.S.A., January 1949. 12 pp. In English.

Egyptian fisheries fall into three categories: the marine fisheries of the Mediterranean and Red Seas, the lake fisheries including the coastal lakes and lagoons, and the inland fisheries of the Nile, with its canals and drainage systems. Production in 1948 was estimated at 42,000 metric tons, to which the three fisheries contributed 29, 59.5, and 11.5 percent respectively. Sardines are the most important marine catch according to this leaflet which gives information on production by species, marketing and distribution, processing, consumption of fish, imports and exports of fishery products, fishing regulations, fisheries administration, conservation research, and fish culture.

Fish Commission Research Briefs. Vol. 2, No. 2 (December 1949). Fish Commission of Oregon, Portland, Oregon, U.S.A., 1949. 36 pp., illus. In English.

"Fish Commission Research Briefs" is the title of a series concerning the current studies of the Fish Commission of Oregon. The present issue contains five biological papers and several short news items. The papers deal with (1) a report on the two species of Columbia River sturgeon, (2) salmon, (3) the pilchard (Sardinops caerulea) situation in Oregon, (4) the lamprey (Entosphenus tridentatus) fishery at Willamette Falls, and (5) the sport fishery for razor clams (Siliqua patula). The sturgeon paper contains information on the fishery, life history of the fish, their rate of growth, food habits, age determination, results of small marking experiments, and an outline of the research program to be continued by the Commission on the two species of sturgeon, including statistical, biological, and hydrological studies, as well as artificial propagation aspects.

Storsildlaget 1927-1937 (Large-herring Association). Olav Fjørtoft. Gustav Puntervold, Jakob J. Saetre, and Ove Hjelkrem, Aalesund, Norway. 1949. 335 pp. In Norwegian.

This book gives a comprehensive account of the first attempt to establish a cooperative association to handle the sale of large herring for Norwegian Winter Herring fishermen. It contains a detailed description and appraisal of this association up to the time when it was merged with the Spring Herring Association (Vaarsildlaget) to form the Norwegian Winter Herring Fishermen's Sales Association (Norges Sildesalslag).

UNITS

Weight, volume, capacity, length, and area are expressed in metric units. "Tons" and "quintals," when not qualified, therefore mean "metric tons" (1,000 kilograms) and "metric quintals" (100 kilograms), respectively.

The term "dollars," unless otherwise specified, refers to U.S. dollars.

CONVERSION FACTORS

Converted from:	To:	Multiplier
General		
Pounds	Metric tons	0.0004536
Hundredweight (112 pounds)	" "	0.050802
Hundredweight (100 pounds)	" "	0.04536
Quintal (112 pounds)	" "	0.050802
Short ton (2,000 pounds)	" "	0.9072
Long ton (2,240 pounds)	" "	1.0161
U.S. gallons	Liters	3.7853
Imperial gallons	"	4.546
Fisheries products		
Hectoliter (herring or oil)	Metric tons	0.093
Wet-salted cod and allied species	Dried basis	0.66

SYMBOLS

... Not available

ø Negligible (less than half the unit used)

- Nil

Other FAO Fisheries Publications

YEARBOOK OF FISHERIES STATISTICS - 1947

Bilingual, English and French, with Preface in Spanish. August 1948. Photo-offset. 368 pp. Price US$4.00 or the equivalent. 1948-49 Yearbook will be available shortly.

Part I of this volume consists of 143 statistical tables on the import and export trade of 61 countries in fish and fisheries products since 1930. Part II contains 86 tables on (a) landings and (b) miscellaneous subjects such as the number of fishermen, craft, etc., for about 20 countries.

SALTED COD AND RELATED SPECIES

FAO Fisheries Study No. 1, English edition published in July 1949, Washington, D.C. Printed xii + 196 pp. French and Spanish editions in press. Price US$2.00 or the equivalent.

A comprehensive study of the factors influencing production and trade of salted cod and related species during the inter-war period, and an analysis of present problems of the salted cod industry. 67 pages of statistical tables.

WORLD FISHERIES ABSTRACTS

Beginning with the January-February issue

A bimonthly review of the technical literature on fishing and the fishing industry. The abstracts are prepared and arranged for card filing.